

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-018348

(43)Date of publication of application : 18.01.2000

(51)Int.Cl.

F16H 9/12  
B60K 17/04

(21)Application number : 10-188894

(71)Applicant : YAMAHA MOTOR CO LTD

(22)Date of filing : 03.07.1998

(72)Inventor : FUKUDA KAZUTAKA

(30)Priority

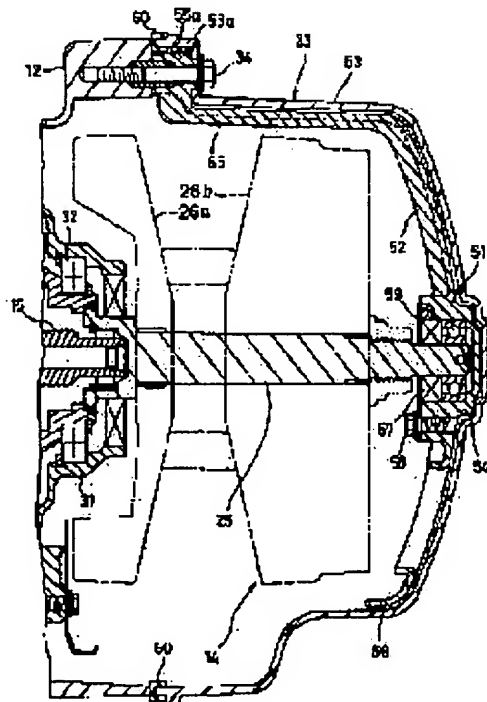
Priority number : 10116786 Priority date : 27.04.1998 Priority country : JP

### (54) CRANKCASE COVER OF VEHICULAR ENGINE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the crankcase cover of a light vehicular engine.

SOLUTION: A crankcase cover 33 is constituted by a metal bearing holder 52 and a synthetic resin made cover main body 53. One end of the drive shaft 25 of a V belt type continuously variable transmission 14 is supported turnably through a bearing 51 by a bearing holder 52. The cover main body 53 is formed so as to cover the entire V belt type continuously variable transmission 14 and fixed to a crank case half part 12 in a state covering the bearing holder 52 from a car body outside.



### LEGAL STATUS

[Date of request for examination]

10.05.2005

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

<http://www19.ipdl.ncipi.go.jp/PA1/result/detail/main/wAA AeQa4cCDA412018348P1.htm>

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] The V belt type automatic transmission arranged in the flank of a crank case with a wrap, from a car-body outside In crank-case covering of the engine for cars which supports the axis end of the driving shaft of this V belt type automatic transmission The metal bearing electrode holder which supports the end section of the driving shaft of said V belt type automatic transmission free [ a revolution ] through bearing, Crank-case covering of the engine for cars characterized by having constituted the whole V belt type automatic transmission from a body of covering made of wrap synthetic resin, and said body of covering fixing a bearing electrode holder to a crank case in the state of a wrap from a car-body outside.

[Claim 2] The bearing attaching part which holds the bearing for driving shaft support for a bearing electrode holder in crank-case covering of the engine for cars according to claim 1, It constitutes from the leg prolonged in an abbreviation radial in side view from this bearing attaching part, and the band-like reinforcement section which connects these legs. Crank-case covering of the engine for cars characterized by having fixed the point of said leg to the crank case with the body of covering, and making other parts of the bearing electrode holder except said point estrange from the body of covering.

[Claim 3] Crank-case covering of the engine for cars characterized by forming a bearing electrode holder and the body of covering in one by insert molding in crank-case covering of a car engine according to claim 1.

---

[Translation done.]

**\* NOTICES \***

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates the V belt type automatic transmission of a crank-case flank to crank-case covering of the engine for wrap cars from a car-body outside.

[0002]

[Description of the Prior Art] Conventionally, as a car which equipped the engine crank case with the V belt type automatic transmission, there is a small car for irregular ground transit, for example. Crew sits down ranging over a saddle type sheet, and this car grasps and runs the steering handle ahead of a sheet, and carries the engine down [ between a sheet and a steering handle ].

[0003] A crankshaft is made for the engine of this small car for irregular ground transit to \*\*\*\* to a crank case so that the direction of an axis may point to the cross direction, and it is infixing the V belt type automatic transmission between this crankshaft and a back output shaft. The V belt type automatic transmission had the driving shaft linked to the end section of said crankshaft, and the driven shaft located behind a car body from this driving shaft, and has taken the driving pulley shafted on both [ these ] shafts, and the structure which wound the V belt around the driven pulley almost. Said driving shaft makes a crank case support one edge by the side of a crankshaft free [ a revolution ], and is making crank-case covering support the other end free [ a revolution ] through bearing. Moreover, the driven shaft made the crank case support both ends free [ a revolution ] through bearing, and has equipped with the driven pulley the end section which made the side project from a crank case. The engine output shaft is connected to this driven shaft.

[0004] Said crank-case covering is formed with an aluminium alloy so that it may have the reinforcement which can support the end section of said driving shaft, it fabricates a V belt type automatic transmission in a wrap configuration from a car-body outside, and is fixing it to the side edge section of a crank case. In the conventional car for irregular ground transit, this crank-case covering has extended to near the upper part of foot rest.

[0005]

[Problem(s) to be Solved by the Invention] However, since the whole crank-case covering was formed with the aluminum alloy, there was a problem that weight became heavy.

[0006] It was made in order that this invention might cancel such a trouble, and it aims at offering crank-case covering of the lightweight engine for cars.

[0007]

[Means for Solving the Problem] Crank-case covering of the engine for cars applied to this invention in order to attain this object constitutes the metal bearing electrode holder which supports the end section of the driving shaft of a V belt type automatic transmission free [ a revolution ] through bearing, and the whole V belt type automatic transmission from a body of covering made of wrap synthetic resin, and the body of covering fixes a bearing electrode holder to a crank case in the state of a wrap from a car-body outside.

[0008] Since a metal bearing electrode holder can be arranged only in the driving shaft side of a V belt type automatic transmission, heavy metal material stops weight existing [ the reinforcement by the side of a driven shaft ] in the part which may be low relatively according to this invention.

[0009] Crank-case covering of the engine for cars concerning other invention In crank-case covering of the engine for cars concerning invention mentioned above, while installing the leg in an abbreviation radial in side view from a bearing attaching part, a bearing electrode holder It considers as the configuration which connects these legs in the band-like reinforcement section, the point of said leg is fixed to a crank case with the body of covering, and other parts of the bearing electrode holder except said point are made to estrange from the body of covering.

[0010] Since a bearing electrode holder can be formed so that the volume may become necessary minimum, while the weight of a bearing electrode holder becomes light according to this invention, heat capacity decreases. Moreover,

since the lateral part and bearing electrode holder of the body of covering will be in a non-contact condition, heat does not conduct them from a crank case directly to the lateral part of the body of covering through a bearing electrode holder.

[0011] Crank-case covering of the engine for cars concerning other invention forms a bearing electrode holder and the body of covering in one by insert molding in crank-case covering of the engine for cars concerning invention mentioned above. According to this invention, a bearing electrode holder and the body of covering can be attached in a crank case in the condition of having been combined mutually.

[0012]

[Embodiment of the Invention] Drawing 1 thru/or drawing 9 explain the gestalt of 1 implementation of crank-case covering of the engine for cars concerning this invention to a detail below the gestalt of the 1st operation. The side elevation carrying the engine which has crank-case covering which drawing 1 requires for this invention of the small wagon for irregular ground transit, the left side view which looked at drawing 2 from the car-body left-hand side of a crank case, the right side view which looked at drawing 3 from the car-body right-hand side of a crank case, and drawing 4 are the top views of a crank case, and this drawing fractures the part which supports a V belt type automatic transmission, and is drawn.

[0013] A V-V line sectional view [ in / in drawing 5 / drawing 3 ] and drawing 6 are drawings showing a bearing electrode holder, and the right side view and this drawing (b) showing the condition of having seen this drawing (a) from car-body right-hand side are a left side view showing the condition of having seen from car-body left-hand side. A VII-VII line sectional view [ in / in drawing 7 / drawing 6 ], a VIII-VIII line sectional view [ in / in drawing 8 / drawing 6 ], and drawing 9 are the IX-IX line sectional views in drawing 6 .

[0014] In these drawings, it is the small wagon for irregular ground transit by the gestalt of this operation which is shown with a sign 1. Crew sits down ranging over a sheet 2, and this small wagon 1 grasps and-runs the steering handle 3 ahead of a sheet 2, between a sheet 2 and the steering handle 3, arranges a fuel tank 4 and carries the engine 5 of this fuel tank 4 which drives four wheels caudad. Moreover, behind [ which is shown with a sign 6 in drawing 1 ] foot rest, this small wagon 1 has formed the footstool 7, in order to extend the range on which crew's guide peg can be put.

[0015] Said engine 5 is a water cooling type four-cycle single-cylinder engine, and has connected the shaft drive type gear 11 for transmitting power to a front wheel 9 and a rear wheel 10 at a crank case 8. As shown in drawing 2 and drawing 4 , said crank case 8 provides the gearing type change gear 16 behind the car body from the crankshaft 15, while it is formed by the crank-case half section 12 on the right-hand side of a car body, and the crank-case half section 13 on the left-hand side of a car body and makes the crank-case half section 12 on the right-hand side of a car body support the V belt type automatic transmission 14 as shown in drawing 4 . This engine 5 has taken the structure where a revolution of said crankshaft 15 is transmitted to said shaft drive type gear 11 through the V belt type automatic transmission 14 and the gearing type change gear 16.

[0016] The crankshaft 15 of an engine 5 has equipped the edge on the left-hand side of a car body with the flywheel magneto 18 while connecting the V belt type automatic transmission 14 to the edge on the right-hand side of a car body through a centrifugal clutch 17, as shown in drawing 4 . Moreover, this crankshaft 15 is making the balancer 19 located behind a car body carry out gearing association of the part on the left-hand side of a car body with gears 20 and 21, as shown in drawing 2 and drawing 4 from crank 15a. Furthermore, gearing association of the cooling water pump shown in the axis end section on the left-hand side of [ car-body ] this balancer 19 with a sign 22 in drawing 2 is carried out with gears 23 and 24 ( drawing 2 , 4 reference). In addition, since said centrifugal clutch 17 has taken the conventionally same structure as a well-known thing, it has been drawn in the condition of having simplified to extent which an appearance configuration understands in drawing 4 .

[0017] The driving shaft 25 connected so that said V belt type automatic transmission 14 might be prolonged through said centrifugal clutch 17 at the cross direction at the edge on the right-hand side of [ car-body ] a crankshaft 15, The driving pulley 26 shafted to this driving shaft 25, and the driven shaft 28 which arranged so that it might become a driving shaft 25 and parallel from said driving shaft 25 behind a car body, and shafted the driven pulley 27, It is the thing of well-known structure conventionally [ equipped with V belt 29 wrapped around said driving pulley 26 and driven pulley 27 ], and is arranging in the outside of the change gear room 30 (refer to drawing 4 ) in which a crank case and the gearing type change gear 16 mentioned later are held.

[0018] While said driving shaft 25 makes the crank-case half section 12 on the right-hand side of a car body support the edge on the left-hand side of a car body free [ a revolution ] through cylinder-like the bearing bracket and bearing 32 which are shown with a sign 31 in drawing 4 and drawing 5 , crank-case covering in which the edge on the right-hand side of a car body is shown with a sign 33 all over said both drawings is made to support it free [ a revolution ]. As shown in drawing 5 , while fixing fast pulley 26a of the actuation pulley 26 to the edge on the left-hand side of [ car-body ] this driving shaft 25, movable pulley 26b is shafted on the right-hand side of a car body from this fast pulley

26a. This movable pulley 26b is made to support in the direction of an axis free [ migration ] through the sleeve which is not illustrated to a driving shaft 25. Said crank-case covering 33 is fixed with the bolt for mounting which is the thing of a car-body outside to a wrap sake, and shows the V belt type automatic transmission 14 to the edge on the right-hand side of [ car-body ] the crank-case half section 12 on the right-hand side of a car body with a sign 34 in drawing 3 and drawing 5.

[0019] Moreover, said driven shaft 28 penetrated the wall 35 (refer to drawing 4) prolonged in the vertical direction of the crank-case half section 12 on the right-hand side of a car body, and the cross direction of a car body, and has extended to the wall 36 of the crank-case half section 13 on the left-hand side of a car body, and said both walls 35 and 36 are made to support it free [ a revolution ] through bearing 37 and 38.

[0020] Said gearing type change gear 16 is the thing of well-known structure conventionally [ equipped with the main shaft 40 connected to the driven shaft 28 of said V belt type automatic transmission 14 through the gearing 39 for gear change, the countershaft 41 which this main shaft 40 was made to carry out gearing association, and the change gear style 43 which has the shift fork 42 to which the shifter (not shown) which engages with said gearing 39 for gear change is moved in accordance with a main shaft 40 ], as shown in drawing 2 and drawing 4. In addition, he is trying for this gearing type change gear 16 to change gears by operating the control lever 44 (referring to drawing 1) arranged in car-body left-hand side from said fuel tank 4.

[0021] Said shaft drive type gear 11 had the driving shaft 45 (refer to drawing 2 and drawing 4) made to support free [ a revolution ] so that it might extend at the cross direction of a car body in the lower part of the crank-case half section 12 on the right-hand side of [ said ] a car body, and it has taken the structure of transmit the power of the engine 5 transmitted to this driving shaft 45 to a front wheel 9 and a rear wheel 10. While arranging said driving shaft 45 in the outside (car-body right-hand side) of said change gear room 30 of a crank case 8 and making the edge by the side of before a car body project from the front end section of the crank case 12 on the right-hand side of a car body, the edge on the backside [ a car body ] is made to project from the back end section of the crank-case half section 12. The front wheel 9 was connected to the edge by the side of before [ of a driving shaft 45 ] a car body through the front-wheel side driven shaft shown by sign 45a in drawing 1, and the rear wheel 10 is connected to the edge on the backside [ a car body ] through the universal joint shown by sign 45b, and a rear wheel side driven shaft (not shown) into drawing 2 and drawing 4. Moreover, the countershaft 41 of said gearing type change gear 16 is made to carry out gearing association of this driving shaft 45 through the bevel gear shown with signs 46 and 47 in drawing 2 and drawing 4.

[0022] Here, the configuration of the wrap crank-case covering 33 is further explained to a detail for said V belt type automatic transmission 14. As this crank-case covering 33 is shown in drawing 3 and drawing 5, the metal bearing electrode holder 52 which supports the edge on the right-hand side of [ car-body ] said driving shaft 25 free [ a revolution ] through bearing 51, and the whole V belt type automatic transmission 14 are constituted from a body 53 of covering made of wrap synthetic resin, and this body 53 of covering is fixing the bearing electrode holder 52 to the crank-case half section 12 on the right-hand side of [ in a crank case 8 ] a car body in the wrap condition from the car-body outside.

[0023] As shown in drawing 3 and drawing 5 - drawing 9, said bearing electrode holder 52 is constituted from a bearing attaching part 54 holding said bearing 51 for driving shaft support, the leg 55 prolonged in an abbreviation radial in side view from this bearing attaching part 54, and the band-like reinforcement section 56 which connects these leg 55, and forms said each part in one with the aluminum alloy. Point 55a (installation side edge section) of said leg 55 is fixed to the crank-case half section 12 with said body 53 of covering.

[0024] Moreover, said bearing attaching part 54 of the bearing electrode holder 52 has equipped the engine 5 side with the seal member 57 from said bearing 51, as shown in drawing 5. With the stopper plate 59 fixed to the bearing attaching part 54 with the bolt 58 for immobilization, this seal member 57 is held at the bearing attaching part 54 so that it may not separate.

[0025] Immobilization in the crank-case half section 12 of said bearing electrode holder 52 and body 53 of covering carries out fitting of the rim section 53a of the body 53 of covering to point 55a of said leg 55 of the bearing electrode holder 52, as shown in drawing 5, and he is trying for the bearing electrode holder 52 and the body 53 of covering to contact mutually only by this fitting section. That is, other parts of the bearing electrode holder 52 except said point 55a are made to estrange from the body 53 of covering. In addition, between the whole region of the opening edge of the body 53 of covering, and the crank-case half section 12, the seal member shown with a sign 60 is infixed into drawing 5.

[0026] Moreover, the bearing electrode holder 52 forms rib 52a in the side face by the side of an engine (car-body left-hand side), and he is trying to have the reinforcement which can support the end section of a driving shaft 25, as shown in drawing 6 (b) and drawing 8, and 9, taking the structure where the volume becomes small as much as possible.

[0027] Thus, a configuration of the crank-case covering 33 comes to locate in the side of the body 53 of covering made

of synthetic resin the right leg of the crew who took this small wagon 1, as a two-dot chain line L shows in drawing 3. For this reason, it becomes the body 53 of covering that crew's right leg contacts in this small wagon 1.

[0028] The heat of the engine 5 which conducts the synthetic resin which forms the body 53 of covering to the lateral part of the body 53 of covering with which crew's right leg contacts since the heat conductivity is smaller than an aluminium alloy is maintained low.

[0029] Since this crank-case covering 33 can arrange the metal bearing electrode holder 52 only in the driving shaft 25 side of the V belt type automatic transmission 14, heavy metal material stops moreover, weight existing [ the reinforcement by the side of a driven shaft 28 ] in the part which may be low relatively.

[0030] Furthermore, while installing the leg 55 in an abbreviation radial in side view from the bearing attaching part 54, the bearing electrode holder 52 Consider as the configuration which connects these leg 55 in the band-like reinforcement section 56, and point 55a of said leg 55 is fixed to the crank-case half section 12 with the body 53 of covering. Since other parts of the bearing electrode holder 52 except said point 55a are made to estrange from the body 53 of covering, it can form so that the volume may become necessary minimum compared with the case where the bearing electrode holder 52 is formed in the configuration in which opening like the shape of a closed-end cylinder is not formed. Consequently, while being able to make weight of the bearing electrode holder 52 light, the radiant heat which lessens heat capacity and is emitted to the body 53 of covering from the bearing electrode holder 52 can be reduced. And since the lateral part and the bearing electrode holder 52 of the body 53 of covering will be in a non-contact condition, heat does not conduct them from the crank-case half section 12 directly to the lateral part of the body 53 of covering through the bearing electrode holder 52.

[0031] Crank-case covering concerning gestalt this invention of the 2nd operation can be formed as shown in drawing 10. Drawing 10 is the sectional view showing the gestalt of other operations, about the same as that of what was explained by said drawing 1 thru/or drawing 9 in this drawing, or an equivalent member, the same sign is attached and detailed explanation is omitted.

[0032] The crank-case covering 33 shown in drawing 10 is fabricating the body 53 of covering so that the metal bearing electrode holder 52 may be wrapped in with the body 53 of covering made of synthetic resin. That is, where the metal mold which fabricates said body 53 of covering is loaded with the bearing electrode holder 52, resin shaping of the body 53 of covering is carried out, and the bearing electrode holder 52 and the body 53 of covering are formed in one by insert molding.

[0033] In addition, the driving pulley 26 of the V belt type automatic transmission 14 shown in drawing 10 also fixes to a driving shaft 25 fast pulley 26a located in car-body left-hand side, and is making the driving shaft 25 support movable pulley 26a located in car-body right-hand side free [ migration in the direction of an axis ] through a sleeve 61. A sign 62 shows a wait.

[0034] Thus, since the formed crank-case covering 33 can attach the bearing electrode holder 52 and the body 53 of covering in a crank case 8 in the condition of having been combined mutually, it can be easily attached to a crank case 8.

[0035] In addition, although the gestalt of operation mentioned above showed the example which applies this invention to the engine 5 of the small wagon for irregular ground transit, if this invention is an engine which makes wrap crank-case covering support the end section of the driving shaft of said change gear, it can apply a V belt type automatic transmission to the engine of any cars.

[0036]

[Effect of the Invention] Since a metal bearing electrode holder can be arranged only in the driving shaft side of a V belt type automatic transmission according to this invention as explained above, heavy metal material stops weight existing [ the reinforcement by the side of a driven shaft ] in the part which may be low relatively. Consequently, lightweight-ization can be attained compared with the conventional crank case.

[0037] A bearing electrode holder is constituted from a bearing attaching part, the leg which fixes a point to a crank case, and the reinforcement section, and according to other invention which makes other parts except the point of said leg estrange from the body of covering, since a bearing electrode holder can be formed so that the volume may become necessary minimum, weight of a bearing electrode holder can be made light. Moreover, since heat capacity decreases, the radiant heat emitted to the inner surface of the body of covering from a bearing electrode holder decreases. And since the lateral part and bearing electrode holder of the body of covering will be in a non-contact condition, heat does not conduct them from a crank case directly to the lateral part of the body of covering through a bearing electrode holder.

[0038] Therefore, crank-case covering can be formed still more lightly by lightweight-ization of a bearing electrode holder. And since a bearing electrode holder becomes the medium of heat transfer and heat is not transmitted to the lateral part of covering with the structure where a bearing electrode holder is located between the lateral part of the

body of covering, and a crank case, said lateral part is maintainable to low temperature.

[0039] According to other invention which forms a bearing electrode holder and the body of covering in one by insert molding, since a bearing electrode holder and the body of covering can be attached in a crank case in the condition of having been combined mutually, crank-case covering with the easy assembly to a crank case can be offered.

---

[Translation done.]



\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## DESCRIPTION OF DRAWINGS

---

### [Brief Description of the Drawings]

[Drawing 1] It is the side elevation carrying the engine which has crank-case covering concerning this invention of the small wagon for irregular ground transit.

[Drawing 2] It is the left side view seen from the car-body left-hand side of a crank case.

[Drawing 3] It is the right side view seen from the car-body right-hand side of a crank case.

[Drawing 4] It is the top view of a crank case.

[Drawing 5] It is a V-V line sectional view in drawing 3.

[Drawing 6] It is drawing showing a bearing electrode holder.

[Drawing 7] It is a VII-VII line sectional view in drawing 6.

[Drawing 8] It is a VIII-VIII line sectional view in drawing 6.

[Drawing 9] It is an IX-IX line sectional view in drawing 6.

[Drawing 10] It is the sectional view showing the gestalt of other operations.

### [Description of Notations]

1 [ -- The crank-case half section, 14 / -- A V belt type automatic transmission, 15 / -- A crankshaft, 25 / -- A driving shaft, 33 / -- Crank-case covering, 51 / -- Bearing, 52 / -- A bearing electrode holder, 53 / -- The body of covering, 54 / -- A bearing attaching part, 55 / -- The leg, 56 / -- Reinforcement section. ] -- The small wagon for irregular ground transit, 5 -- An engine, 8 -- 12 A crank case, 13

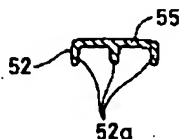
---

[Translation done.]

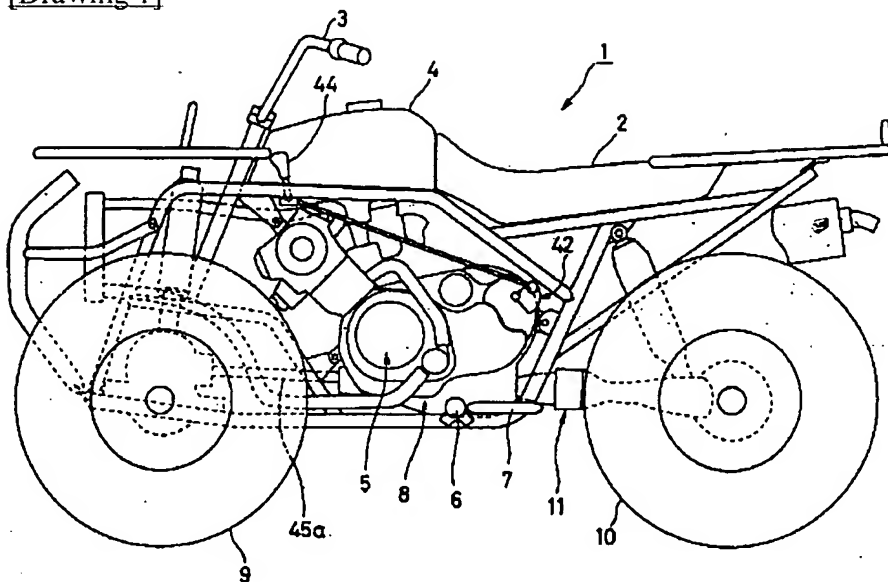
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DRAWINGS

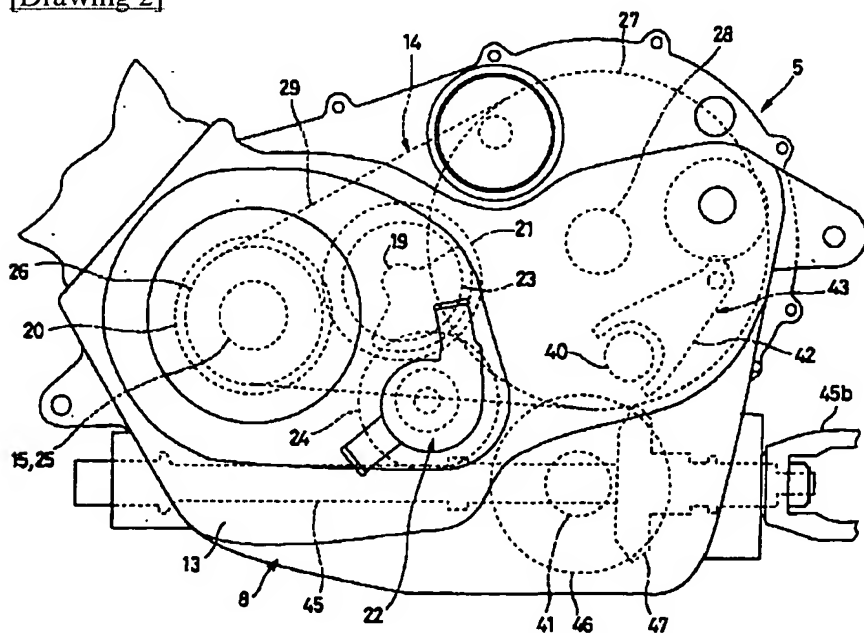
[Drawing 9]



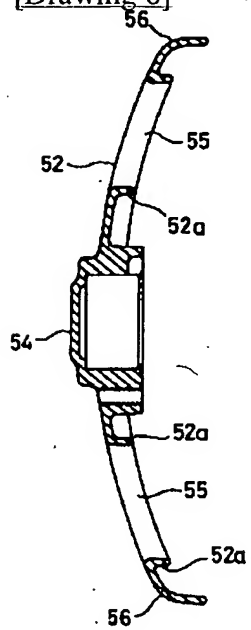
[Drawing 1]



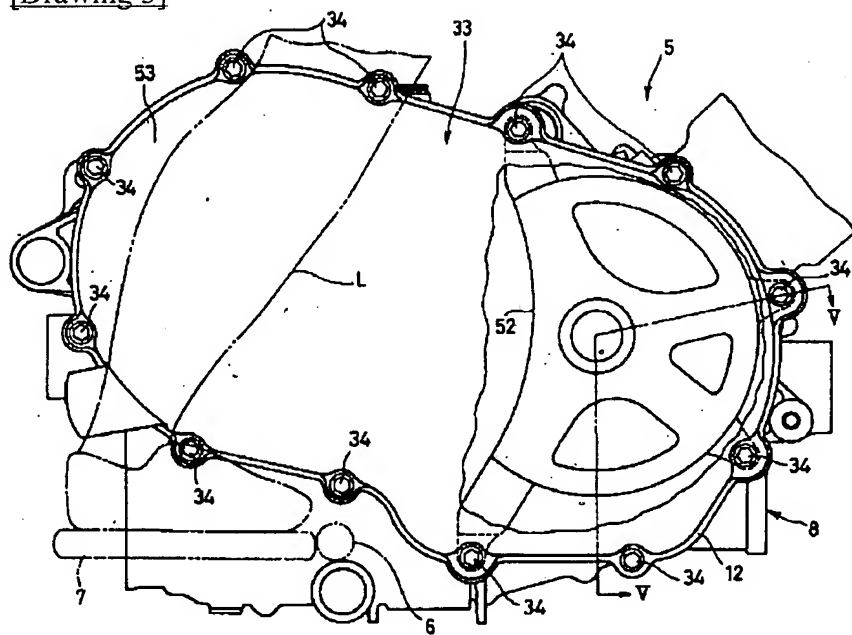
[Drawing 2]



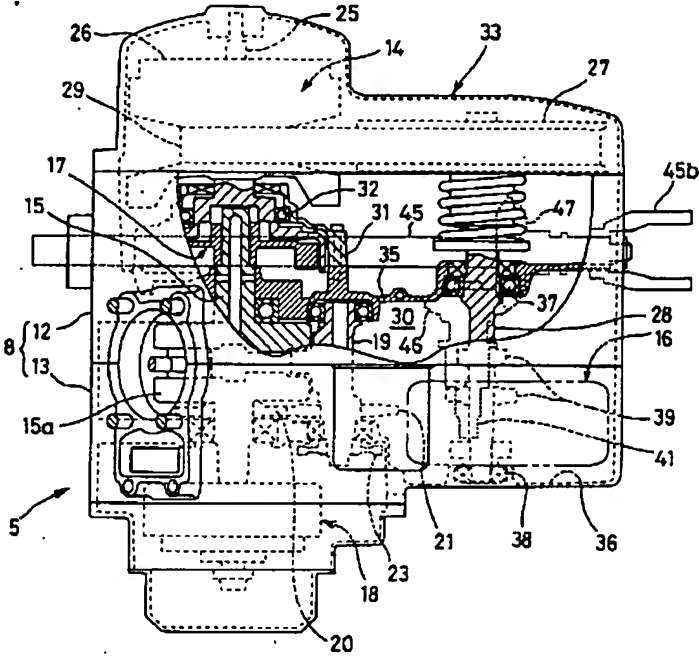
[Drawing 8]



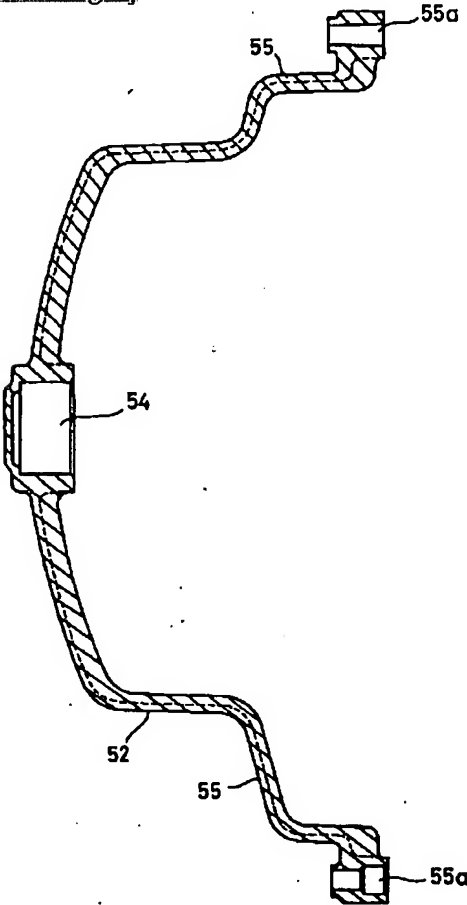
[Drawing 3]



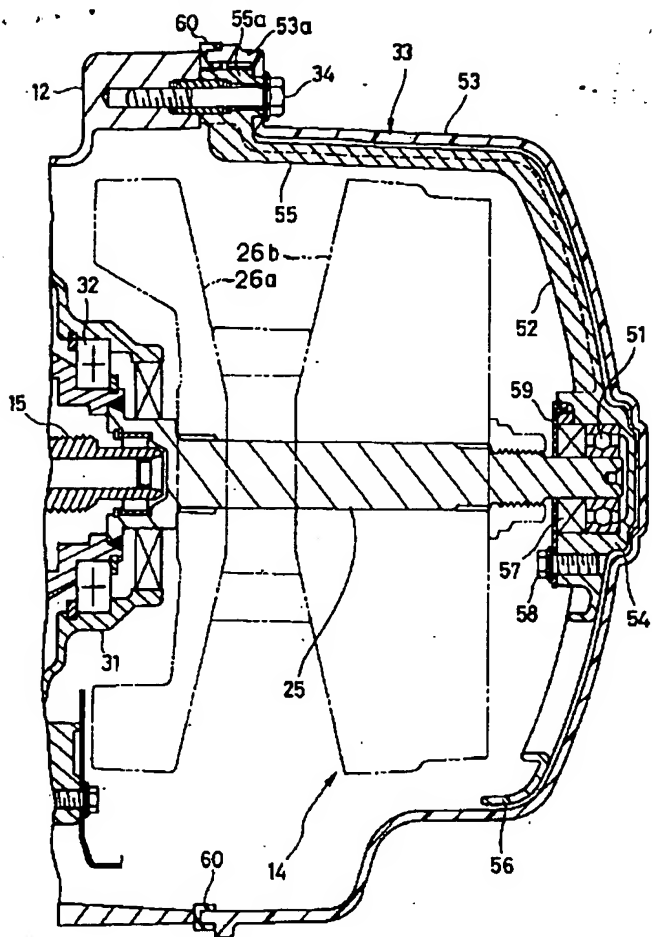
[Drawing 4]



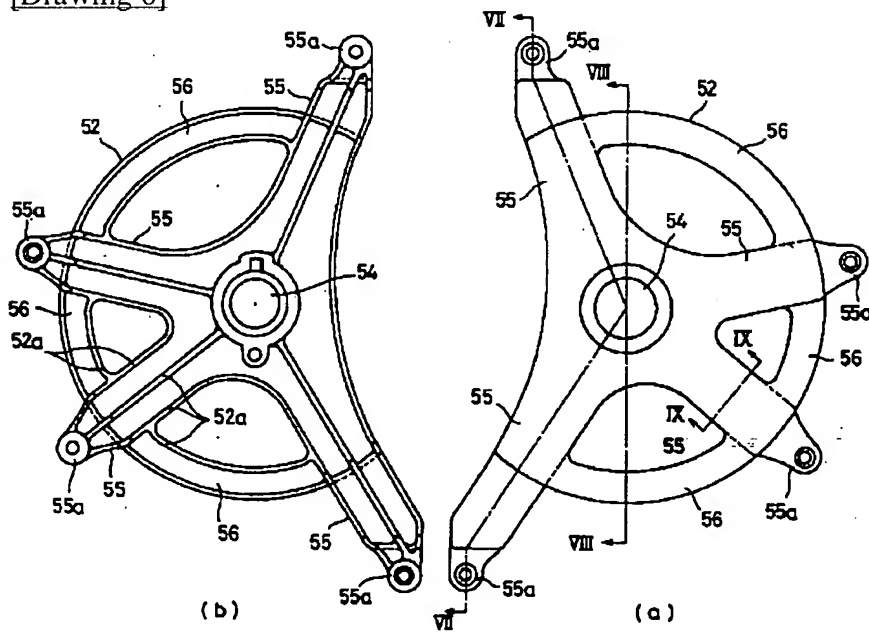
[Drawing 7]



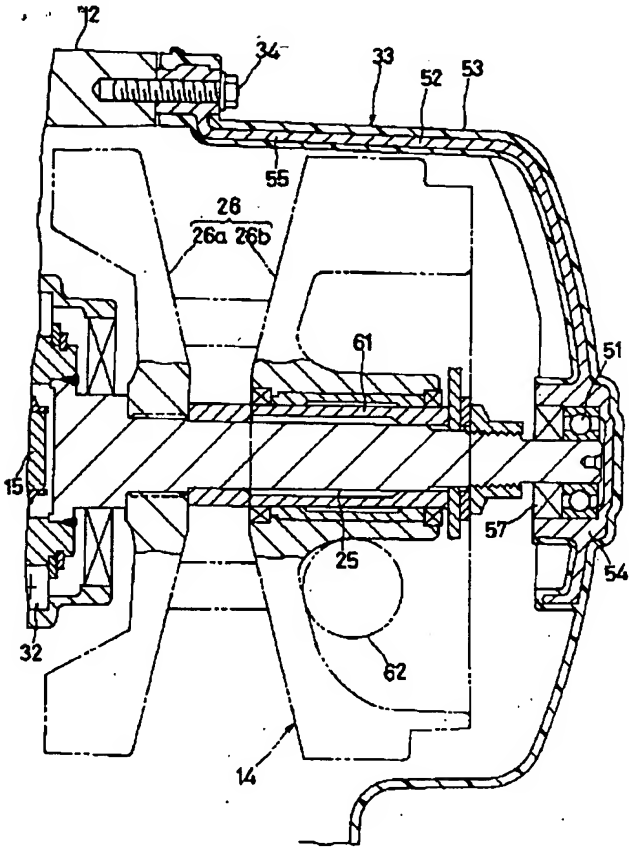
[Drawing 5]



[Drawing 6]



[Drawing 10]



[Translation done.]